REMARKS

This is in response to the Office Action mailed June 9, 2006. Claims 1, 2, 5, 11, 12, 14, 16, and 17 have been amended to correct inconsistencies without adding new matter. Specifically, these claims have been amended to correct the phrase "monoatomic metal film" to recite "a monoatomic film including a metal". This language does not constitute new matter as similar language was presented in, for example, claim 1 of the application-as-filed.

Claims 19-23 are newly added without adding new matter. Support for newly added independent claim 19 can be found in the previously presented claims and the description of the "first embodiment", "second embodiment", and "third embodiment" in the specification of the Application-As-Filed.

Reconsideration of this application is respectfully requested in view of this response/amendment.

STATUS OF CLAIMS

Claims 1-18 are pending.

Claims 2-4 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

Claims 1, 6, 7, 12, 13, and 14-18 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. 6,908,639 (Basceri).

Claims 2, 3, 4, 7, and 8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 6,458,416 (Derderian).

Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 6,908,639 (Basceri) in view of U.S. 6,458,416 (Derderian) as applied to claims 1 and 2 above, and further in view of U.S. 2005/0009335 (Dean).

Claim 10 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 6,908,639 (Basceri) in view of U.S. 6,458,416 (Derderian) as applied to claims 1 and 2 above, and further in view of U.S. 6,767,582 (Elers).

Claim 9 is rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 6,908,639 (Basceri) in view of U.S. 6,458,416 (Derderian) as applied to claims 1 and 2 above, and further in view of U.S. 6,858,547 (Metzner).

Claims 19-23 are newly added without adding new matter.

OVERVIEW OF CLAIMED INVENTION

In one non-limiting example, a method to form a semiconductor device comprises the steps of: depositing a monoatomic film including a metal on a base by using a metal source including a compound containing said metal and no oxygen; and depositing a metal oxide film including oxide of the metal on said monoatomic film by using a CVD technique.

In another non-limiting example, a method to form a semiconductor device comprises the steps of: depositing a monoatomic film including a metal on a base in an oxygen-free environment; and depositing a metal oxide film including an oxide of the metal on the monoatomic film using a CVD technique.

In yet another non-limiting example, a method to form a semiconductor device comprises the steps of: depositing a monoatomic seed layer containing a metal on a base by using a metal source including a compound containing the metal and no oxygen, the deposition done via an atomic layer deposition (ALD) technique; and introducing an oxygen source to convert the monoatomic seed layer containing metal to a monoatomic seed layer containing a metal oxide and depositing a film of the same metal oxide on the monoatomic seed layer via a CVD technique.

REJECTIONS UNDER 35 U.S.C. § 112

Claims 2-4 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Claim 1 has been amended to correct inconsistencies without adding new matter. Specifically, independent claim 1 has been amended to correct the phrase "monoatomic metal film" to recite "a monoatomic film including a metal". Also, dependent claim 2 has been amended to recite a "monoatomic film". This amendment should make moot the 35 U.S.C. §112, first paragraph rejection. Applicants respectfully request the Examiner to remove the 35 U.S.C. §112 rejection.

REJECTIONS UNDER 35 U.S.C. §102 and 35 U.S.C. §103

Claims 1, 6, 7, 12, 13, and 14-18 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. 6,908,639 (Basceri). To be properly rejected under 35 U.S.C. §102(e), the cited reference must teach each and every element of the rejected claim(s). Applicants respectfully assert that the Basceri reference fails to anticipate or render obvious many of the features of Applicants' rejected claims.

Basceri teaches an interface forming method comprising the steps of: forming a first capacitor plate with a conductive first layer comprising a first metal; chemisorbing on and in contact with the first layer an interface layer comprising at least two monolayers that each have the first metal intermixed with a second metal different from the first metal; and forming a capacitor dielectric with an insulative second layer comprising the second metal on and in contact with the interface layer and improving adhesion between the first layer and the second layer compared to adhesion otherwise occurring with the second layer formed on and in contact with the first layer in the absence of the interface layer.

Basceri's method addresses the need to "improve adherence" between a first and a second layer via an interface layer (for example, see column 4, lines 36-37 and column 57-60). To understand how Basceri's method improves adhesion between a first and second layer via an interface layer, the Examiner is respectfully directed to column 4, lines 24-37 which teaches one aspect of Basceri's invention. A portion of this citation is reproduced below to aid the Examiner:

> "...According to one aspect of the invention, an interface forming method may include forming a first layer containing a first chemical element and chemisorbing on the first layer an interface layer containing at least one monolayer of the first chemical element intermixed with a second chemical element different from the first chemical element. The method can further include forming

a second layer containing the second chemical element on the interface layer..." (emphasis added)

The three-layered structure defined by Basceri's invention is graphically represented below:

LAYER II
CONTAINING
CHEMICAL II

INTERFACE LAYER
CONTAINING
CHEMICAL I INTERMIXED WITH CHEMICAL II

LAYER I
CONTAINING
CHEMICAL I

Basceri's interface layer aiding in adhesion between Layer I and Layer II

The Examiner's attention is respectfully directed to column 4, lines 50-60, which reinforces with an example of the method of Basceri. A portion of this citation is reproduced below to aid the Examiner:

"...In keeping with the various aspects of the invention described herein, an interface layer can be formed between the Pt and Ta_2O_5 that includes intermixed Pt and Ta_2O_5 formed by ALD..." (emphasis added)

In accordance with Basceri's generic structure having three layers shown above, the specific structure of the above-cited example is shown below to aid the Examiner.

LAYER II CONTAINING Ta_2O_5

INTERFACE LAYER CONTAINING
Pt INTERMIXED WITH Ta_2O_5

LAYER I CONTAINING Pt

Basceri's interface layer of Pt intermixed with Ta_2O_5 aiding in adhesion between Pt and Ta_2O_5

Applicants assert that the only mention of the chemical vapor deposition technique is a general reference to the "general technology" of CVD. In fact, Basceri contrasts the CVD technique with the ALD technique described within via the following statement:

> "...such condition is contrasted with the purging criteria for traditional ALD wherein a substrate is contacted with a single deposition species that chemisorbs to a substrate or previously deposited species..."

Based on a reading of the citations and the entire Basceri reference, Applicants respectfully assert that the mention of CVD process by Basceri merely contrasts the available prior art process of

CVD with the ALD technique used by Basceri. Further, as shown above, Basceri merely uses the ALD technique to chemisorb an interface layer containing a first chemical element intermixed with a different second chemical element (e.g., $Pt + Ta_2O_5$).

In stark contrast, independent claims 1, 14, 17, and 19 teach the deposition of a first layer of monoatomic film including metal and a second layer of metal oxide, with NO mention of a third intermediate layer. Hence, Applicants respectfully assert that the Basceri's method cannot anticipate or render obvious the methods of independent claims 1, 14, 17 and 19.

Also, in stark contrast, independent claim 1 teaches a step of "depositing a monoatomic film including a metal on a base by using a metal source including a compound containing said metal and no oxygen". Similarly, claims 14 and 17 teach the step of "depositing a monoatomic film including a metal on a base in an oxygen-free environment." Newly added claim 19 teaches the step of "depositing a monoatomic seed layer containing a metal on a base by using a metal source including a compound containing said metal and no oxygen, said deposition done via an atomic layer deposition (ALD) technique". It can be seen that Applicants' claimed monoatomic film is NOT formed based on the "intermixing" a first chemical element with a different second chemical element. Hence, Applicants respectfully assert that the Basceri's method cannot anticipate or render obvious the methods of independent claims 1, 14, 17 and 19.

Also, according to independent claims 1, 14, 17, and 19, the monoatomic film includes a metal and the deposited metal oxide film (deposited via CVD) is made from the same metal. There is NO teaching or suggestion in Basceri for such a feature. Hence, Applicants respectfully

assert that the Basceri's method cannot anticipate or render obvious the methods of independent claims 1, 14, 17 and 19.

Hence, at least for the above-mentioned reasons, Applicants respectfully assert that independent claims 1, 14, 17, and 19 are in allowable form, and hereby request allowance thereof.

If the Examiner still feels that the mere mention of the deposition of a first chemical element intermixed with a second chemical element anticipates the deposition of a monoatomic film including metal, Applicants respectfully remind the examiner that it is the duty of the examiner to specifically point out each and every limitation of a claim being rejected as per §1.104(c)(2) of Title 37 of the Code of Federal Regulations and section 707 of the M.P.E.P., which explicitly states that "the particular part relied on must be designated" and "the pertinence of each reference, if not apparent, must be clearly explained and each rejected claim specified".

The above-mentioned arguments with respect to independent claims 1, 14, 17, and 19 substantially apply to dependent claims 2-13, 15-16, 18, and 20-23 as they inherit all the features of the claim from which they depend. Hence, Applicants respectfully request the Examiner to remove the rejections with respect to dependent claims 2-13, 15-16, 18, and 20-23, and hereby request allowance thereof.

SUMMARY

As has been detailed above, none of the references, cited or applied, provide for the specific claimed details of applicants' presently claimed invention, nor renders them obvious. It is believed that this case is in condition for allowance and reconsideration thereof and early issuance is respectfully requested.

As this response/amendment has been timely filed, no request for extension of time or associated fee is required. However, the Commissioner is hereby authorized to charge any deficiencies in the fees provided to Deposit Account No. 50-1290.

If it is felt that an interview would expedite prosecution of this application, please do not hesitate to contact applicants' representative at the below number.

Respectfully submitted,

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